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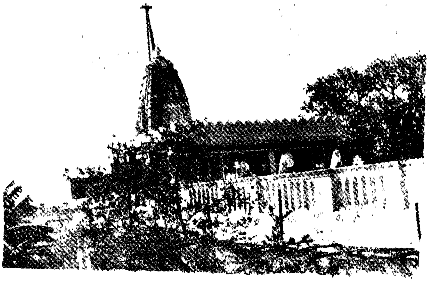
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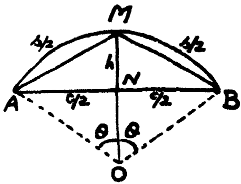
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Jaina Formulas for the Arc of a Circular Segment

Radha Charan Gupta



Let AB be a chord of a circle whose centre is at 0. The middle point of the chord is at N, and M is the mid-point of the bounding arc forming the segment A N B M which is assumed to be not greater than the semi-circle.

Let

chord	ANB	$= c$
arc	AMB	$= s$
height	MN	$= h$
and radius	OM	$= r = d/2$

We have

$$AM^2 = AN^2+MN^2=(c/2)^2+h^2$$

Therefore, the length of the broken chord AMB

$$= AM+MB=2AM$$

$$= (c^2+4h^2)^{\frac{1}{2}} \qquad \ldots \quad (1)$$

Thus we see that the length of the arc AMB must be greater than the expression (1), that is

$$s > (c^2+4h^2)^{\frac{1}{2}} \qquad \ldots \quad (2)$$

The true relation between c, h, and s is given by

$$s = 2r\theta - d\theta \quad \ldots (3)$$

where d and θ are given by

$$c^2 = 4h(d-h) \quad \ldots (4)$$

$$\sin\theta = c/d \quad \ldots (5)$$

The determination, from given c and h, of the exact value of s by using (3) involves a knowledge of trigonometrical functions and tables which may not be known. And it may be desirable to find s approximately by some simple rule which, of course, must satisfy the conditions of the inequality (2). For example, Heron of Alexandria (between c.50 and c 250 A.D.) gave[1]

$$s = (c^2+4h^2)^{\frac{1}{2}} + (h/4) \quad \ldots (6)$$

and one more similar formula

Preserving the simplicity and form of the expression in (2), the Indians evolved formulas of the type

$$s = (c^2+kh^2)^{\frac{1}{2}} \quad \ldots (7)$$

where k is to be taken greater than four. But then, how to find k ? The Indians (particularly the early Jainas) selected that value of k which will make (7) yield the desired result in the case of a semi-circle (which is also a segment of the circle). That is, when

$$h = r \text{ and } c = 2r$$

we must get, by (7)

$$s = \bar{\Lambda} r$$

Hence we must have

$$k = \bar{\Lambda}^2 - 4 \quad \ldots (8)$$

Now the simplest approximation to $\bar{\Lambda}$ is 3 which was known and used by all ancient peoples. This will make k equal to 5 by (8), and (7) will become

$$s = (c^2+5h^2)^{\frac{1}{2}} \quad (9)$$

[1] T. Heath, *History of Greek Mathematics*, Vol II, p 331 (reprinted, Oxford, 1965)
The date of Heron is now fixed in the second half of the first century A.D. See O Neugebauer, *The Exact Sciences in Antiquity*, p. 178, Harper Torchbook edition, N Y. 1962

This approximate formula is found in the *Gaṇita-sāra-saṅgraha* (=*GSS*), VII, 43 of the Jaina author Mahaviracarya (c. 850 A.D.) in the following words[2]

śaravargāt-pañcaguṇāj-jyāvargayutātpadaṁ kāṣṭham //43//

'The square-root of the sum of five times the square of the *śara* (height of the segment) and the square of the chord is the arc.'

However, the commonly used value of π by the Jainas was $\sqrt{10}$ which[3] will yield k equal to 6 by (8) and (7) will become

$$s = (c^2+6\ h^2)^{\frac{1}{2}} \quad \ldots \quad (10)$$

This formula is found almost in all Jaina works on mathematics and cosmography (in Prakrit and Sanskrit). For example, the *Bhāṣya* on the *Tattvārthādhigama-sūtra* (=*TDS*), III, 11, says[4]

iṣuvargasya ṣaḍguṇasya jyāvargayutasya kṛtasya mūlaṁ dhanuhkāsṭhaṁ

'Take the sum of the six times the square of the *iṣu* (height of the segment) and the square of the chord ; its square-root is the arc.'

Some other references to (10) are :

(*i*) *Kṣetrasamāsa* whose authorship is attributed to Umasvati[5].

(ii) *GSS*, VII, 73½ (p. 198) as an accurate rule.

[2] The *GSS* edited with Hindi translation by L. C. Jain, p 190, Sholapur, 1963 (Jain Samskriti Samrakshaka Sangha).

[3] The present author proposes to prepare a separate paper on this Jaina value of π Also see his article on 'Some Ancient Values of Pi and Their Use in India' (Glimpses of Ancient Indian Mathematics or G.A.I.M. No. 13), *The Mathematics Education*, Vol. IX, No. 1 (March, 1975), Sec. B, pp. 2-3.

[4] See the *Sabhasya- TDS* edited with Hindi translation of Khuba Chandra, p. 170, Bombay, 1932 (Paramasruta Prabhavaka Mandala).
The date of Umasvati (the author of *TDS*) is about 40-90 A.D. according to J. P. Jain, *Jaina Sources of the History of Ancient India*, p. 267, Delhi 1964 (Munshi Ram Manohar Lal); and about 4th or 5th century A.D. according to Nathu Ram Premi, *Jaina Literature and History* (in Hindi), p. 547, Bombay, 1956 (Hindi Grantha Ratnakara). Premi maintains that the author of the *TDS* is also the author of the *TDS-Bhasya* which we have quoted. But there is a disagreement on this point also among the scholars.

[5] See H. R. Kapadia (editor), *Ganita Tilaka*, Introduction, p. XL II, Baroda, 1937 (Oriental Institute).

(iii) *Mahā-siddhānta* (=*MS*), XV, 90, of Aryabhata II (c.950 A.D.) as an approximate rule[6].

(iv) *Tiloyasāra* =(*TS*), *gāthā* 760 (second half), of Nemicandra (10th century) in the following Prakrit words[7].

baṇakadim chahi gunide tattha jude dhanukadī hodi // 760 //
(*bāṇakṛtim ṣadbhih gunite tatra yute dhanuh kṛtih bhavati*)

'Six times the square of the *bāṇa* (height of the segment) added there (to the square of the chord stated in the first half of the *gāthā*) becomes the square of the arc (of the segment).'

That is,

$$s^2 = c^2 + 6h^2 \quad (11)$$

(v) *Jambū-paṇṇatti-samgaho* (=*JPS*), II, 24, and VI, 10, of Padmanadi[8].

The *JPS*, II, 28 (p. 13) gives the form (11) and states that it was said so by Jinendradeva.

If we use the relation (4) which was well-known to ancient Indians (including the authors mentioned above), then the formula (10) can be written as

$$s = \sqrt{[2\{(d+h)^2 - d^2\}]} \quad (12)$$

A rule which gives this formula is found in the *Tiloya-paṇṇati* (=*TP*), IV 181, of Yativṛṣabha as follows[9]·

[6] *MS* edited by Sudhakara Dvivedi, p 171 (fasciculus II), Benares, 1910 (Benares Sanskrit Series Nos. 148-150)

[7] The *TS* (Sanskrit, *Trilokasara*) edited by Manohar Lal Sastri, p 303, Bombay, 1918 (Manik Chand Digambar Jain Granthamala No 12)

[8] *JPS* edited by A N. Upadhye and Hiralal Jain, pp 12 and 101, Sholapur 1958 (Jain Samskriti Samrakshaka Sangha)
According to the editors (Introduction p.14), Padmanandi might have composed the *JPS* about 1000 A.D
The present author has noted several other direct and indirect references to the formula (10) both in Jaina and non-Jaina works But it seems unnecessary to quote them all here

[9] *TP* (Sanskrit, *Triloka-prajnapti*), Part I, edited by A N. Upadhye and Hiralal Jain, Second edition, Sholapur, 1956, p. 163 , also Part II, 1951
According to Dr Upadhye (*TP*, Vol II, Introduction, p 7) the *TP* is to be assigned to some date between 473 A D. and 609 A.D. However, the work may have acquired its present form as late as about the beginning of the ninth century (*TP*, Vol II, Hindi Introduction, p 20)

bāṇajudaruṃdavagge ruṃdakadi sodhidūṇa duguṇakado /
jaṃ laddhaṃ taṃ hodi hu karaṇīcāvassa parimāṇaṃ // 181 //

'From the square of the sum of the bāṇa (height of the segment) and diameter, subtract the square of diameter and multiply by two. The square-root of the result is a measure of the arc (of the segment).'

If we take the approximation 22/7 for π, then (8) will give k equal to 288/49 and in this case (7) will become

$$s = \sqrt{c^2 + (288/49)h^2} \qquad . \quad (13)$$

A rule giving this formula is found in *MS*, XV. 94 (p. 173) as an accurate method for finding the circular arc. Thus we see that the autho- of the *MS*, a non-Jaina work, tried to improve the formula (10) by eml ploying a better value of π. However, the basic principle behind alr these formulas is same as stated above to derive (8).

Since the formulas (10) to (13) were derived by using analogous and empirical comparision with a semi-circle, it will not be fair to check their accuracy for small arcs as suggested sometimes. (e.g. see *JPS*, Introduction, p. 53).

For accurate rectification of small circular arcs the following formula is found in the works of Nilakantha Somayaji (c.1500)[10]

$$s = \sqrt{c^2 + (16/3)h^2} \qquad . \; . \quad (14)$$

However, this was based on a different principle and is the best formula of the type (7) for small arcs, because from

$$2\,\theta\, r = \sqrt{(2r \sin\,\theta)^2 + k(r - r \cos\,\theta)^2}$$

we get

$$k = 4(\theta^2 - \sin^2\theta)/(1 - \cos\,\theta)^2$$

which tends to 16/3 as θ tends to 0.

The formula (10) seems to be used by Mahaviracarya even to find the (accurate) perimeter of an ellipse. In this connection his *GSS*, VII, 63 (p 196) states

vyāsakṛtiṣaḍguṇita dvi saṃguṇāyāma kṛtiyutā (padaṃ) paridhiḥ

[10] See R. C Gupta, 'Neelakantha's Rectification Formula' (GAIM No 1) *The Mathematics Education*, Vol VI, No. 1 (March, 1972), Sec. B, pp. 1-2

'(The square-root of) the sum of six times the square of the breadth and the square of double the length is the (accurate) perimeter (of an elongated circle). That is, perimeter of an ellipse

$$= (16\,a^2+24\,b^2)^{\frac{1}{2}}$$

$$= 2\sqrt{(2a)^2+6\,b^2} \qquad \ldots \quad (15)$$

where a and b are the semi major and minor axes. From (15) it is clear that the *GSS* rectification of an ellipse is equivalent to considering half of the ellipse (being bisected by the major axis) to be segment of a circle with

$$c = 2a$$

and $h = b$

This technique of empirical generalization has been further used to find the area of an ellipse by an analogous rule for a circle[11].

[11] R. C. Gupta, 'Mahaviracarya on the Perimeter and Area of an Ellipse' (GAIM No. 9), *The Mathematics Education*, Vol. VIII, No. 1 (March, 1974), Sec. B, pp. 17-19

Chant for a Jaina Child

LEONA SMITH KREMSER

Shanti ...

Like unto the Lord Nemi,
Hold me the religion of non-injury
That lets all living things live peacefully.

Like unto the Lord Nemi,
Find me a festival of joy in my duty
To my Jaina prayer and to my Jaina study.

Like unto the Lord Nemi,
Overflow me with my pity
For the food-animals in their crying misery.

Like unto the Lord Nemi,
Eat me all my food harmlessly
For my gift of life to the animal community

Like unto the Lord Nemi,
Cast me down my jewels gladly
Lest their wrong possession deceive me.

Like unto the Lord Nemi,
Take me the Jaina Three Jewels, truly
Right Faith, Right Knowledge and Right Conduct
protect me.

Like unto the Lord Nemi,
Keep me always a Jaina devotee
That I be a living temple of mercy.

Like unto the Lord Nemi,
Pray me shed my impure body
And in my pure soul live for eternity.

Shanti, Shanti ...

Location of the Place of Enlightenment of Lord Mahavira

KANHAYALAL SARAOGI

It is universally agreed and believed by all the sects of the Jainas that the last Tirthankara Lord Mahavira attained full knowledge at Jrimbhikagama on the northern bank of the river Rijukulya or Rijubalika under a Sala tree on Vaisakha sukla 10 in the afternoon. Regarding the further movements etc. of the Lord, we find two different stories. The Digambaras say that after attaining *kaivalya* or becoming all-knowing, Lord Mahavira going from place to place ultimately reached Vipula Hill in Rajagrha. He kept silence all the way and did not preach or give any discourse, because, according to them (the Digambaras) a Tirthankara will not speak unless and until a Ganadhara or a learned disciple is present there.

Indra, the king of gods, found out a very learned Brahmana, Gautama Indrabhuti, and brought him near the Lord so that he might speak. Thus Indrabhuti became the first follower and disciple of Lord Mahavira and after he was admitted to the Order, the Lord's superhuman dialogues started This happened on the 1st day of Sravana

The Svetambara story is a bit different It tells us that the Lord after passing the 12th rainy season of his ascetic life at Campa (near Bhagalpur) and passing through Jrimbhikagama, Medhia, Chammani etc. had travelled to Pava and thence again to Jrimbhikagama. At Jrimbhikagama, he sat in meditation under a Sala tree in the field of one Syamaka, not very far from the old and dilapidated Vyavrit Caitya on the northern bank of the river Rijukulya. He was undertaking the sixth fast. It was in the afternoon, when the shadows had moved towards the east, when the sun had descended towards the western horizon, that he attained full knowledge and following the tradition he waited there for a while and started his preaching. But as there was no human being present at the time, no one took the vow of abstention. The Lord then perceived in his vision that a rich Brahmana Somila was celebrating a great *yajña* at Pava, in which the top ranking learned persons from different places were participating. The Lord thought it to be highly opportune and fruitful to go there and start his preaching.

He immediately walked on to Pava, which was 12 *yojanas* away from Jrimbhikagama (according to calculation, as given in the *Bhagavatī Sūtra* 6/7, 12 *yojanas* will be equal to 54 or 55 miles). A *Samavasaraṇa* (religious discourse pavilion) was got erected there the next day. People flocked there to hear him and have his *darśan*. Indrabhuti Gautama, one of the participants in the *yajña*, also came to know of the arrival of Lord Mahavira, and taking him to be a hypocrite, went to out-wit him in discussion. But lo ! he became a follower of Lord Mahavira alongwith all his 500 disciples. Another ten topmost Brahmanas and their disciples also followed suit. The Lord waited there for some days more and then went to Rajagrha, where he passed the 13th rainy season (*Kalpasūtra*, 120).

The aim of our thesis is to locate Jrimbhikagama. Before pursuing our point, we would like to refer to some of the previous assumptions regarding the location of the above-mentioned place. Present Jharia, Jamui, Jambhi, Jogram (Burdwan) etc. are among the places believed to be the possible sites where Lord Mahavira got full-Knowledge. The Barakar river is presumed to be the old Rijubalika. Some scholars have laboured to prove that the Poonpoon, the Aji or the Kamsa etc. to be the Rijubalika. In our opinion none of these assumptions has got any substance or solid grounds. As we have already seen above, the Lord travelled 12 *yojanas* from Jrimbhikagama to reach Pava, none of the places named above is at the distance of 12 *yojanas* either from Pavapuri (Nalanda district) or Pavanagar (Deoria District). Besides, the names of the rivers too have no similarity with Rijubalika or Rijukulya. So no one among the aforesaid places can be accepted to be Jrimbhikagama.

We have set out on a journey to explore the real place by sticking closely and carefully to the versions of the Jaina literature. Let us also follow the path Lord Mahavira had travelled after the completion of the 12th rainy season. He had started from Campa and moved westward, crossing the Ganges somewhere near Sonepur, at a point west of the river Gandaka. He arrived at Jrimbhikagama and proceeded further north-west to Medhiya—in our opinion Manjha, then according to us to Chammani), i.e., Chhitauli and reached Pavanagar (Sathiaon-Fazilnagar). He then returned to Jrimbhikagama and again went to Pava etc.

This route naturally suggests that Jrimbhika must be somewhere to the south-east of Pava and north-west of Campa, at a distance of 54-55 miles from Pava. This place is quite easy to be located in the district of Siwan or Saran. In our opinion Jhanjhwa is the ancient Jrimbhikagama.

A small rivulet flows by the side of Jhanjhwa towards the south-east. It might have its origin somewhere in the northern parts of the eastern U.P. In Buddhist scriptures we find mention of a river by the name of Kulya flowing six miles south-east of Kushinagar. This is extinct now. We presume this to be the river Rijukulya which before it became dead or extinct, flowed through Jhanjhwa It may have been a branch of the river Narayani (Gandaki) flowing there.

The most important and decisive point is the presence of a Sala tree at Jrimbhikagama We all know that Sala trees are found in north-eastern U.P., Nepal and north Bihar only. The belt starting from the district of Gorakhpur to Tirhut division, between the Himalayas and the Ganges, has been the producing area of Sala trees Sala trees are totally absent in the regions south of the Ganges We do not find any mention of the presence of a Sala tree in any one of the scriptures, in the said area. Hence Jrimbhikagama can never be spotted anywhere either in south Bihar or in west Bengal.

Four factors will determine the genuineness of the location of Jrimbhika, viz, (1) the name of the place should resemble the name of Jrimbhika, (2) there must be a river or river bed whose name should resemble the name of Rijukulya, (3) the place must be in a Sala growing belt and (4) the place must be at a distance of 12 *yojanas* (about 54-55 miles) from Pavanagar towards Campa or south east Jhanjhwa fulfils these conditions. Hence our location of Jrimbhika at the present-day Jhanjhwa is fully justified

Jhanjhwa is on the metaled road running from Gopalganj to Barauli in the old district of Saran in Bihar The road joins the national Highway connecting Lucknow with Assam The nearest railway station (about 4 miles) is Sidhwalia on the Chapra-Siwan loop line of N E. Rly.

Antiquity of Bharata War as Revealed from Jaina Astronomy

SAJJAN SINGH LISHK AND S D. SHARMA

The sage Vyasa is said to have compiled the great epic *Mahābhārata* and Vaisampayana recited it to king Janmejaya Some schools are biased against the historical authenticity of Bharata war. But such views are more or less based on qualitative survey of language, popular myths, and geneology etc. and coupled with more of subjectivity. Qualitative analysis is more or less only a means to quantitative analysis based on astronomical method for the determination of historicity of an event. Besides it is worth reproducing words of V C Pandey[2]:

'In a country like India which abhorred fanaticism and monolithic approach and which did not persecute the Kautsas and the Carvakas who denounced the *Vedas* and God respectively, the historicity of the Mahabharata war could not have gone uncontested, if it were myth.'

The factual memory of this war was not only preserved in Brahmanical literature but also in Buddhist and Jaina canonical literature abundent in many astronomical observations which are quite dependable and many results are also supported by archaeological evidences. Here the antiquity of Bharata war has been quantitatively analytically examined in the context of its relevance to the Jaina astronomical data of post-Vedanga pre-Siddhantic period popularly known as the dark period in the history of ancient Indian astronomy[3].

Kaye has opined that *Mahābhārata* dated about 400 B.C. to 400 A.D.[4] This assignment seems to be worth pondering in the light of the fact that *Mahābhārata* contains some astronomical references[4] to bigger cycles like *mahayuga*, *kalpa*, etc., specific order of planet, i.e. Venus, Jupiter, Mercury, Mars, Saturn, Rahu and the other planets, (ii.11.37) notion of solar months with refence to eight auspicious *saṅkrāntis* also ; 13 days halfmonth, which according to Dixit implies true computations of planets and the notion that the large stars look so small in concequence of their distances (iii.42-24)[5]. Such references are not found in Vedanga Jyotiṣa[6] but they are dealt with part and parcel in Siddhantic astronomy ascribed to 3rd/4th century A.D., but as a matter of fact the

antiquity of *Sūrya Siddhānta* (200 B C), the earliest milestone in Siddhantic astronomy, is still controversial. Such views were naturally held in esteem in the absence of any link between Vedanga Jyotisa and Siddhantic astronomy. However our investigations into *Ganitānuyoga*, a class of Jaina works[7] chiefly dealing with Jaina astronomical and geographical data, reveal out that Jainas had not merely aquainted themselves with Vedanga Jyotisa, but also advanced the cause of astronomy to a greater extent and had ranked it as an essential part of education of a Jaina priest[8]. Jainas had explicitly developed notions of declination[8], celestial latitude[9], and obliquity of ecliptic.[10] *Yoga* and *Karana* were added to the incomplete *pañcānga* of Vedanga Jyotisa[11]. The zodiacal stretches of *nakṣatras* were first measured by Jainas who later evolved the system of graduating the zodiacal circle into modern degrees[12]. The probable course of conversion of 30-fold system of time units (Trigesimal system as we have called it) extant in Atharva Veda Jyotisa into the Sexagesimal system[13] was made during Jaina astronomical period and the system was later commonly used in Siddhantic astronomy. Such notions have not been unearthed in *Mahābharata* so far. It may therefore be strongly emphasized that *Mahābhārata* dates earlier than the Jaina School of astronomy was profoundly established. Evidences are still wanting to prove this view .

a *Mahābharata* contains time-units like *kalā*, *kāṣṭhā* etc resembling with Vedanga Jyotisa units of time, but Jaina texts present an advanced system of time-units like *muhūrta*, *truti*, *kalā*, *lava*, and *nimesa* etc[13].

b *Mahābharata* does not contain any reference to week days[1], and we do not find it in Jaina texts[7] also

c Tilak's interpretation of the 13 days' half month implying the knowledge of very accurate astronomical computations has been refuted by K. L Daftari[14] arguing that the 14th *tithi* coming on a day on which at the sunrise there was the 13th *tithi*, was made the 15th *tithi* by the Rahu i.e. by the eclipse This view is more authenticated by the fact that the calculated *tithi* was longer than the actual one and hence the error was rectified through the direct observation of the phenomenon of eclipse formation.

d Some western scholars[1] agree that astronomical references found in *Mahābhārata* could not have entered it before Hipparchus (C. 150 B.C) and therefore they ascribe *Mahābhārata* to a period near the advent of the Christian era, but such references are related to Jaina

astronomical developments of the post-Vedanga pre-Siddhantic period. For example, the Vedanga Jyotisa Dhanisthadi[6] system of *nakṣatras* was changed into Sravanadi system as found in *Mahābhārata* before the Jaina's Abhijitadi system[7] was held in esteeem.

In the context of these arguments, suffice it to say that *Mahābhārata* contains much that belongs to the intermediate period when the Jaina astronomical system was gaining over Vedanga Jyotisa. There has been a tradition[15] in ancient India that astronomical computations were based on the sidereal system over many centuries before any rectification was made for the error into the calculated and observed phenomena. On the basis of Dhanisthadi system of *nakṣatras*, Vedanga Jyotisa is generally ascribed to about 14th century B.C.[1] Whereas Jaina texts contain much that belongs to about 5th/6th century B.C.[19] when the Jaina School of astronomy has gained a vigorous momentum under the celebrity of Lord Mahavira Therefore the notion of Sravanadi system may be assigned an intermediate period of about first millenium B C The date of the painted greyware as also of the discovery of Iron, both associated with the Aryans, have been put around 1000 B.C. by archaeologists[2]. K.L. Daftary on analysing the astronomical data as found in *Mahābhārata* has given its date to be about 1200 B.C.[14] Of course, there is always a possibility of difference of 200 or 300 years in such astronomical calculations[2], whereas the general precession takes about a thousand years to cross over the zodiacal stretch of a *nakṣatra*. However astronomical evidences are quite dependable as they are confirmable in the mathematical texture in relation to one another. However a similar difference of a few hundred years also creeps into the method of carbon dating of an event[2].

Besides, the fact that *nakṣatras* are chiefly given to be 27 in number in *Mahābhārata*, except a passing reference to the 28th *nakṣatra*[1] whereas Jainas astronomical computations are solely dependable on the system of 28 *nakṣatras*[7] Obviously *Mahābhārata* should be assigned a period in between Vedanga Jyotisa and Jaina astronomy, but attention may be called upon the fact that there is a legend (*Maitreyīya Brāhmaṇa* iii, 230,11) that the 28th *nakṣatra*, Abhijit, dropped out but *Taittirīya Brāhmaṇa* (I.5.2.3) marks it as a new comer.[4] Abhijit is mentioned as a fallen star in *Mahabhārata* (iii.232.2) also[1]. It therefore suggests that *Mahābharata* belongs to the Brahmanic period as also Jaina system of 28 *nakṣatras* does. However it cannot be ascertained as to how far the Jaina school of astronomy had been independently flourishing parallel to Vedanga Jyotisa till it gained over the latter in the post-Vedanga pre-Siddhantic period. The possibility of such a tradition is, of course, evident from the

preservation of Jaina continuity of 24 Tirthankaras (ford-makers) with Lord Mahavira as the last one of the second round,[17] and from the diversity of three different schools of ancient Indian astronomy i.e. Lagadha, Videha and Gandharva [18]

Consequently it may be inferred that *Mahābhārata* belongs to a period earlier than first millenium B.C. and some later interpolations in the text should not be confused with which however, on the other hand, might be related to a different school of astronomy of this period which can be ascertained only when the different schools viz. Lagadha, Videha, and Gandharva etc. are properly unearthed. Several important results have been obtained from our investigations into the field of Jaina Astronomy[20] belonging to post-Vedanga pre-Siddhantic period and compared with Jaina astronomy an analytical study of *Mahābhārata* is still in progress

Acknowledgement

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Sukumarika

GANESH LALWANI

Barren and dry like a desert was the life of Sukumarika, the merchant-daughter. Or like the furnace of Sun-burnt summer midday. Nowhere there was shade or coolness. Not a bit of it, as if a frowning curse had encircled her whole life in coils of snake

But Sukumarika knew not what was that curse. Advent of youth had made her form beautiful, overflowing like a stream. Her lips were athirst with desire. They wanted to be pressed by two warm lips with passionate kisses And her body to loose its entity under the pressure of two strong arms. But would it be possible ? Ever possible ?

Adjacent to her house was the garden where she came and sat on the bed of flowers under a Punnaga tree. Infront of her was a pool of clear water and beyond it was the darkness of dense forest. But could the coolness of that clear pool or the dark shade of that distant forest cool her heart ?

Slowly came her friend Sucarita and stood beside her She wanted to console her but could not say anything Tears rolled down the cheeks of Sukumarika and she began to tremble like a Ketaki leaf.

'Be calm, Sukumarika ' at last she was able to say

But how she could calm herself ? The fulfilment of a woman's life is in becoming a bride and mother of children That remains unfulfilled in her life even when it appeared that these are going to be fulfilled

She could distinctly remember the full moon night of the month of Baisakh That day it was Sucarita who decorated her as bride. She could also remember how she entered the pleasure house with her groom at the end of ceremonial rites. She came with her blazing garments, flower decorations and ornaments for the first night. Jasmine white moon beam of the full moon night was lying on her bed. In the coolness of that night how enchantingly her lover looked at her face. She was trembling at that time in an estatic mood, as if her life, her youth was on the verge of supreme fulfilment. She felt the tightening embrace of two strong arms,

sweet fragrance of the warm breathing. No smell of flower is so exhilarating. But at the next moment he pushed her aside crying 'burning, burning'. Was she then a poison-girl whose touch created a burning sensation ? Sagar, her groom, left not only that pleasure house that night but left the city of Campa also leaving no clue of his whereabouts. How could she bear this tragedy all her life ?

There was no end of worries of his father Sagaradatta. Sukumarika was his only daughter. He gave her in marriage to her equal, but ways of karma were very difficult to predict. Otherwise, how the touch of a beautiful woman could bring burning sensation ? What could he do ?

No, he could not do anything. Because, even setting aside the social rules, ignoring the practice of the gentle, he gave her in marriage to another young man, so that she may be happy. But the happening of the first night repeated itself. He also like Sagar left the pleasure house crying 'burning, burning' and vanished never to return.

A pea-hen cried from behind the leaves of the Tamala tree, but in the life of Sukumarika the gladness of the Pea-hen at the advent of rains will never echo.

Days passed by. So the months and years. A day loomed like a year. But there was no end of Sukumarika's unbearable life. Now and then she thought of ending her life. What's the utility of bearing it like this ? One day she would get down in the pool not to rise again.

Her father could guess the intention of her inner heart. Warning her he said, 'My daughter! Don't try to end your life in haste. It's not worthwhile. You have to bear this ordeal in the next life. Behind all this is the ill-karma of your previous life. So be patient and try to destroy it by practising dharma, so that your future life may be bright.'

These words of her father brought some solace to her troubled mind. She said, 'Father, then I should take initiation as nun.'

Sagardatta drew a heavy sigh then replied, 'As your pleasure, my daughter.'

Sukumarika took initiation from the nun Gopalika. Now she began to forget herself by religious practices, austerities and fasting, but she could not forget the desire of warm kisses of her first youth and the dream of close embrace. She could feel that the lotus-bud of her life was still

abloom in the depth of the darkness of the barren heart, it had not dried or fallen by the heat of the unfavourable wind.

She then gave herself to more austerities. She almost became cruel to herself. But in spite of all these she could not pull her up. Her desires became more misty like the mist of autumn sky. She even dreamt of liberation, liberation not of the Siddhas but liberation from this dry barren and unfulfilled life. She was dreaming of a life which would be hillarious in dances, songs, kisses and passionate embraces. Her eyes glistened like the eyes of the wild doe, shivering in sweet expectation as these thoughts imported the promise of excitement in fleeting moments.

She became still more harsh to her self and subjected it to more and more rituals. And one day she went to the nun Gopalika and asked for her permission to go to the Subhumibhaga garden and concentrate in propitiating the sun

But the permission was not given. She was told that it was not proper for the nuns to propitiate the sun in the open

'Why its not proper?' asked Sukumarika in her heart. She was depressed at the refusal. When she was householder, the nuns never went against her but now why they were so unkind ? She felt a pain in her heart She would propitiate the sun in the open

But then ?

What then- she knew not.

Ignoring the refusal she went to the garden for propitiating the sun Facing the sun she tried to concentrate at her self.

Time passed but the restlessness of her heart died not

The sun was setting slowly. The darkness of night was falling. All the creepers and trees were becoming shadowy. Suddenly she heard someone speaking to her, 'Oh nun, what do you want ?'

'What do I want?' As she began to search her mind she saw two beautiful eyes which were shimmering with love like the waves of the sea in response to the moon. She was fascinated.

'What do you want ?' the question was repeated for the second time.

'What do I want ?' She was going to say something but she cut it short. No., No. She wanted not the liberation or nirvana. She wanted the dreamy days, coolness of the oasis, nectar of the shortlived joy of life.

The same question was repeated for the third time.

Who is asking this question—she asked herself. And to look at him as she opened her eyes, she saw no one. But then her eyes fell on that woman who was sitting in the lap of his lover under the shade of Saptaparna tree. Another lover was combing her hair by the swift movement of his fingers. Still another was blowing the palmleaf to cool her cheeks moist with perspiration. The fourth was decorating her breasts with red powder by the tender offshoot of a tree, while placing her bare legs on his lap with affection the fifth was colouring them with the intensity of a lover and an artist. The smile of the blossomed flowers spread on her lips, she could not tear away her eyes from the scene She chanted in her mind, if I have earned any good karma by propitiating the sun I may have five husbands like her.

Previous life of Draupadi, wife of five Pandavas, *Trisastisalakapurusa caritra*

Development of Jaina Ontological Ideas

MOHAN LAL MEHTA

Ontology is the basis of epistemology and ethics. Some ontological entity is essential for epistemological and ethical investigations. Like other schools of Indian Philosophy, Jainism has also developed its ontological concepts.

Jaina ontology starts with the concept of *loka*. In the *Ācārāṅga*, which is the oldest Jaina text, the word *loka* is used in two different senses: (1) the living beings and (2) the universe in which the living beings etc. live[1] The *Sūtrakṛtāṅga* uses the word *loka* in the latter sense. According to it, the universe is eternal but not endless[2]. Here the eternity is temporal, whereas the end is spatial. Since the extent of the universe is limited, it is implied that there is *aloka* (the non-universe) beyond *loka* Hence, the universe is not spatially beginningless and endless. Of course, it is temporally beginningless as well as endless. The *Ācārāṅga* also refers to *aloka* along with *loka*[3]. The basic Jaina position is that *loka* has got a particular shape and it is surrounded by *aloka*. The *Bhagavatī* (*Vyākhyāprajñapti*) gives some analogies to clarify this concept. It mentions that *loka* lies in the midst of *aloka* just as an island lies in the midst of an ocean, a ship lies in the midst of waters, a hole lies in the midst of a piece of cloth, shadow lies in the midst of sunshine[4] Both *loka* and *aloka* are eternal[5]. There is a dialogue in the *Bhagavatī* which establishes the fact that *loka* consists of souls and matter which *aloka* lacks It is maintained in the dialogue that a god standing at the end of *loka* cannot move about his hand inside *aloka* The reason given for it is that there is no matter in *aloka* which is essential for movement[6] A soul (*jīva*) as well as matter (*pudgala—ajīva*) can move only when placed in the midst of matter. Thus, originally the Jaina concept was that things from *loka* do not intrude into *aloka* simply because the latter is without matter Later it was conceived that nothing from *loka* intrudes into *aloka* because the latter lacks *dharma*,

1 *Acaranga*, 10, 136 etc
2 *Sutrakrtanga*, 1.4 6
3 *Acaranga*, 127
4 *Bhagavati*, p 78 b
5 *Ibid*, p 80 b
6 *Ibid*, p 717 b

i.e. the medium of motion, etc. Of course, *dharma* etc. come within the fold of *ajīva*, i.e the non-living category which includes matter (*pudgala*).

The concept of five extensive substances, i.e. *pañcāstikāyas*, or six substances, i.e. *saddravyas*, is not traceable in the two oldest canonical texts, viz. *Ācārānga* and *Sūtrakṛtānga*. The *Bhagavatī* refers to the five extensive substances, viz. *dharma*, i.e. the medium of motion, *adharma*, i.e. the medium of rest, *ākāśa*, i.e. space, *jīvas*, i.e. souls and *pudgala*, i.e. matter[7]. It also refers to the six substances by adding *addhāsamaya* (*kāla*), i.e. time, which is not an extensive substance, to the above list[8]. Thus, the *Bhagavatī* presents three views with regard to the constitution of the universe: (1) Souls and matter constitute the universe (2) Five extensive substances are the constituents of the universe. (3) Six substances form the universe. These are, so to say, the three stages of the development of Jaina ontological ideas. It is evident from this account that in their search for the basic types of reals, Jaina seers or thinkers must have started with souls and matter. In the course of time, three additional concepts, viz. the medium of motion, the medium of rest and space, were posited. The search came to an end only when the concept of time was added as the sixth.

Of the six fundamental substances, the first five, viz. souls, matter, the medium of motion, the medium of rest and space are called *astikāyas*, i.e. extensive substances, whereas the last category, viz time is regarded as a non-extensive substance The Jaina meaning of extension is different from the sense of material extension It is in the form of plurality of particles or units forming a single body. As souls etc. exist, they are called *asti*, and because they have many *pradeśas*, i e particles or units, like bodies, they are called *kāyas*. Hence, these five are called *astikāyas*, i.e. extensive substances[9]. Time does not consist of such particles. Therefore, it is not an extensive substance It is said to consist of innumerable independent units, i e. entities

What is exactly meant by a *pradeśa* ? It is defined to be that part of space which is covered by an indivisible atom of matter[10]. Thus, a *pradeśa* is a space-point equal in extent to an indivisible material particle. Such *pradeśas* contain not only the material atoms but also the particles of other substances. Just as the space-points are called *pradeśas*, the particles

[7] *Bhagavatī*, 13 4
[8] *Ibid*, 25.4
[9] *Dravyasangraha*, 24
[10] *Ibid*, 27

of a soul etc. are also termed as *pradeśas*. The material particles occupying space-points are known as *paramāṇus* or *aṇus* (atoms).

Of the six substances, the *pradeśas* of each of the four, viz. a soul, the medium of motion, the medium of rest and space, are inseparably mixed up. The material *paramāṇus* are not inseparably mixed up. They can be divided as well as united. Time consists of particle-like independent entities which never mix up. Hence, it is not an extensive substance. Each time-unit is, really speaking, an independent substance. Thus, there are as many time-substances as there are time-units.

As regards the exact definition of substance as such, the *Ācārānga*, the *Sūtrakṛtanga*, the *Bhagavatī* etc. are silent. It is the *Uttarādhayana* that gives a clear definition of substance for the first time. It defines substance as the possessor of qualities and modes. The distinction between qualities and modes is that qualities are possessed only by the substance, whereas modes are in both the substance and the qualities[11]. What are qualities and what are modes ? Those characteristics which are always associated with a substance are qualities and those which are not always associated with it are modes. A substance possesses both. Thus, that which makes distinction between one substance and another is called quality (*guṇa*) and that which makes modification of a substance as well as a quality is called mode (*paryāya*).

The *Tattvārthasūtra* upholds the definition given by the *Uttarādhyayana* at one place[12] but formulates another definition at another place[13]. In one aphorism it maintains that a substance is possessed of qualities and modes, whereas in another aphorism it makes the substance identical with existence or reality and then defines it as characterised by origination, destruction and permanence. Origination is the attainment of another mode by a substance by means of external and internal causes without giving up its essential characteristics. Similarly, the loss of the former mode is destruction. As there is no origination or annihilation of the inherent nature or essential quality of the substance, it is permanent. Thus origination and destruction are nothing but the changing forms or modes of the existing or real substance and permanence is the same as the essential attributes or fundamental qualities of the same. Hence, a real (*sat*) or a substance (*dravya*) is possessed of both change and permanence. Change means origination (*utpāda*) and destruction (*vyaya*) of different

[11] *Uttaradhyayana*, 28.6
[12] *Tattvarthasutra*, 5.38
[13] *Ibid*, 5.30

modes (*paryāyas*). Permanence (*dhrauvya*) means indestructibility of the essential quality (*guṇa*)[14].

It is evident from the above account that the tradition of discussing the nature of the universe and non-universe as well as soul and matter was comparatively old, that of discussing the nature of five extensive substances is comparatively recent and that of discussing the nature of six substances is comparatively more recent. It seems that the tradition of discussing the nature of reality in general is still more recent. This problem as such seems not to have been raised in the old canonical texts. The *Uttarādhyayana* hints at the problem and the *Tattvārtha-sūtra* discusses it in a little detail and comes out with a well formulated answer of which there is no trace in these old texts. The *Bhagavatī* etc. have, no doubt, the concepts of substance, mode, quality etc but the *Tattvārtha* way of defining the real as characterised by origination, destruction and permanence is absent in them

The *Tattvārtha* concept, i.e. Umasvati's concept of reality as the synthesis of permanence and change is further developed by Samantabhadra in his *Āptamīmāmsa*. He has a clear idea of the doctrine of non-absolutism that a thing must be characterised by two mutually contradictory features at one and the same time. In order to justify this position he examines the following ontological pairs of contradictory features :

(1) Existence and non-existence
(2) Identity and difference
(3) Permanence and change
(4) Cause and effect
(5) Substance and mode
(6) Mental existence and physical existence.

Samantabhadra first considers two one-sided views and then offers a synthesis of the two. This framework became model for subsequent Jaina philosophers.

[14] *Ibid*, 5 31

Evolution of Jaina Sangha

J C. Sikdar

(from the previous issue)

Adaptation of Jaina Sangha to environment

In course of time Jaina Sanghas may have become adapted and readapted many times as their environment changed or as they moved to a new environment. As a result many Jaina monastic orders—Svetambaras and Digambaras have organizational structures that are useless or even somewhat deleterious, but which were useful for their survival in earlier times when the Jaina monastic organization was adapted to a rather different social environment

Because of the need for *subhikṣā (navakoti śuddha āhara)* and living space and propagation of religion there was a tendency for each group of monastic orders to spread out and establish itself in as many different habitats as it could reach by travelling on foot and which would support them for missionary work. This evolution from a single ancestral or parental Sangha, of a variety of forms of Jaina Sangha which spread out to different habitats since the post-Mahaviran period particularly may be called adaptive radiation of Jaina Sangha or Sanghas. It is obviously advantageous in enabling Jaina Sanghas or Ganas, or Gacchas to survive in the midst of socio-economic and political turmoils. Conversely, many of the Jaina Sanghas inhabiting the same type of habitat have developed, to some extent similar, monastic structures[68] which make them superficially alike, even though they may be but distantly related, e.g. Kharataragaccha, Tapagaccha, etc. This evolution of similar monastic structures of Jaina Sanghas adapting to similar environment may be called convergent evolution of Jaina Sangha

[68] Both Kharataragaccha and Tapagaccha have similar monastic structures on the basis of *murtipuja* and other monastic rules and regulations, although they differ in other respects, e g ascetic conduct, customs, occultism, Yaksa-Yaksi-*puja*, etc. Similarly, the South Indian Digambara Jaina Sanghas like Mulasangha, Yapaniyasangha, Kurccakasangha, Kasthasangha, Mathurasangha have similar monastic structures, although they differed from one another in some monastic features.

Among the Svetambaras Tapagaccha, etc. in Rajasthan and Gujarat and Senagana, Devagana, Nandigana, etc. among the Digambaras in South India have all evolved respectively similar monastic features and structures which make them look much alike, while Kharataragaccha, etc. in Rajasthan and Gujarat have evolved similar way of monastic structures and ascetic life like Tapagaccha with some differences in ascetic rules, etc In many Jaina Sanghas, Ganas, Gacchas, etc. the specialized adaptation to a certain way of life is simply the latest stage in a series of monastic adaptations. For example both, Sthanakavasin and Terapanthin sects whose immediate parental Gaccha is Lonkagaccha have returned to the anti-image cult and have become adapted to that way of religious life of Lonkamata rather than to the image-cult of Tapagaccha. Readaptation may be a very complicated process in the monastic life. The present day Sthanakavasin sect and the Digambara Terapanthin community are the religious descendants of Lonkagaccha and Taranapanthin sects respectively. There evolved from Lonkamata the monastic forms which in monastic adaptive radiation led to the birth of Sthanakavasin and Terapanthin sects of the Svetambaras successively and developed monastic organizational limbs adapted to a new way of ascetic life Some of the monks of these sects eventually left their own monastic orders and became readapted to the image-cult of Tapagaccha[69]. But some of them went back to Sthanakavasin sect from Terapanthin sects[70], while the Terapanthin and Visapanthin sects of the Digambaras became readapted to the image-cult[71], returning from Taranapanthin Sect of the Digambaras[71], with only this much difference of curtailing the number of items for the worship of the image of the Jinas.

Since one of the major struggles among Jaina Sanghas, Ganas, Gacchas, etc. stem from the competition for necessary requisites and propagation of their respective religious thoughts and ideas and modes of their ascetic life, a change was a historical necessity, enabling a monastic order to use a new type of requisites extremely advantageous to it and to propagate a new thought on religion acceptable to the Jaina followers, of course, without the basic change in Jaina religion and philosophy. This may be accomplished in a number of ways by the evolution of a new energy liberating the Jaina monastic system to attract the people by doing missionary works, such as, temple-construction, repair of old temples, pilgrimage (*vihār yātrā*), observance of *pajjuṣaṇa* (fasting and

[69] e.g. Rsi Bhada of Lonkagaccha readapted to the image-cult of Tapagaccha.
[70] e.g. Sesamalji of Terapanthin sect returned to Sthanakavasin sect.
[71] See *Jainism in Rajasthan*, pp. 92-93.

meditation, etc.), reciting of the religious works like the *Kalpasūtra*, etc., and preaching literary works, etc.[72].

Another type of favourable change is one which decreases the growing period of a Sangha on the total length of time required for a Sangha to develop. Such changes have enabled different Jaina monastic organization to survive further from some unsuitable northern zones of India due to socio-economic and political conditions and opened up a new area of living space and a new source of requisites for Jaina Sanghas to the Western and Southern India [73]

The evolution and adaptation of each Jaina Sangha or Gana or Gaccha have not occurred in a monastic vacuum independent of other forms ; instead, many Sanghas or Ganas or Gacchas, etc have had a marked influence on the adaptation of other Sanghas, or Ganas or Gacchas, respectively. As a result of this many types of cross-dependency between two Sanghas or Ganas or Gacchas have arisen. Some clearest and best understood of these involve Gacchas[74], Sakhas, Kulas, Anvayas of Jaina Sanghas

Sakhas (branches of Jaina Sangha) are necessary for the religious dissemination of a great number of people They are so dependent on certain branches of the monastic order that they are unable to survive as Jaina Sangha in a given region unless those particular groups of Jaina monks are present to preach religion there among them, e.g. some branches of Tapagaccha or of Kharataragaccha and the Murtipujakas (image-worshippers) in Rajasthan could not have flourished there without them even though all social and natural, climatic conditions were favourable until the monks of the particular Gaccha or Sakha (branch) went there and disseminated their religious thoughts and ideas, knowledge, belief and conduct. Other Jaina monastic orders have solved the problems of living in the north or elsewhere becoming immobile during the rainy season or migrating to a suitable place.

[72] These works are being done by various Jaina Sanghas in India at present.

[73] It is to be noted that the birth of the three great religions of India, viz. Vedicism, Jainism and Buddhism took place in Northern India but they were much developed and preserved in Southern India Even to-day Buddhism flourishes in Lanka to the South of India

[74] e g. Kasthasangha had four branches (sakhas), viz Mathuragaccha, Ledabagada-Punnatagaccha and Nanditatagaccha. Bagadagaccha was one of the four divisions of Kasthasangha Probably this Gaccha merged into Ladabagadagaccha See *Bhattaraka Sampradaya*, p 263

A member of Jaina Sanghas stays at a place for *pajjuṣaṇa cāturmāsa tapas* (austerity of four months) over the rainy season. The Jaina monks observe fast and austerity and meditation and use up their stores of body fat, awakening in the autumn in an emaciated condition and probably as hungry of course, with spiritual inspiration.

Any mutation that increases the climatic tolerance of a Jaina Sangha or a group of monks may enable it to inhabit a new part of the country. Adaptations of some Sanghas to other Sanghas or Ganas to Ganas or of Gacchas to Gacchas are so exact that neither form can exist in a region without the other, e.g. Sthanakavasin and Terapanthin monastic orders have evolved to a point of complete interdependence[75].

The monks of Sangha or Gana or Gaccha go to some other Sangha or Gana or Gaccha to collect requisites and take them to other Gaccha Then they put their ideas through this socio-religious contact and behaviour of the Sangha or Ganas or Gacchas and lay the seeds of their own religious thoughts and ideas having an exchange of their doctrinal views. They then carefully put some seeds of their doctrines on the monastic organ of the second Sangha or Gana or Gaccha as Gautama Indrabhuti did on the Parsvapatya order of Kesisvami[76]. In this way the second Sangha or Gana or Gaccha is sure to be fertilized with the thoughts and ideas left behind by the first one and to produce new seeds of religious views.

The Young monks feed on these seeds of new religious doctrine. Thus the second Sangha produces a large number of seeds of new religious dogma and is not injured by the loss of a few seeds of new thought eaten up (i.e. accepted) by the young monks and their subsequent separation from the Sangha.

Conclusion

The study of the history of evolution of Jaina Sangha in different ages of Indian society, like other social activities, is governed by the dominant tendencies of the time and the place. The Jaina world in different ages had been living under the dominion of two institions. Jaina religious system and Jaina monastic order, i.e. Dharma and Sangha.

75 At present the inter-relation and inter-dependence among the different Jaina Sanghas—Svetambaras and Digamabaras and other branches even are good. They are helpful to one another in all respects of ascetic life.

76 *Uttaradhyayana Sutra* 23.

These two institutions attained a general supremacy in the Jaina community in India at different ages preceding our own because they offered some religious solutions for the chief religious problems of the Jainas with which those ages had been confronted. Their enthronment signified the completion of the ages which had sought and found salvation in them; their survival bears witness to the creative power of the Tirthankaras and the Jainacaryas, and the Jainas have grown up under their shadow. In this religious system and monastic order the Jainas still like and move and have their being and the power of these two inherited institutions over their religious life is reflected in the hold which they possess over their religious concepts and ideas, thought and imaginations.

History of evolution of Jaina Sangha requires to be comprised of sustained chronicle of its tradition, but it is not possible to determine the historicity of the successive chronological order of Jaina Sangha from the time of Rsabhadeva, the first Tirthankara up to that of Mahavira on the basis of Agamic references in the absence of genuine contemporary corroborative historical evidences regarding the historical existence of the Tirthankaras from Ajitanatha to Aristanemi except merely placing the twentyfour Tirthankaras in successive order according to the Jaina tradition.

A particular stage of Jaina Sangha is marked by certain religious achievement, besides the hopes and aspirations which it sought to realize for its followers. Such hopes and aspirations receding to the past inspire the religious achievements with a halo about the first originator of Jainadharma and Sangha—Rsabhadeva. The historicity of this first Tirthankara may be established with some evidences furnished by the *Rgveda* and the *Bhāgavata purāna* and the Vatarasana Munis mentioned in the *Rgveda* can definitely be identified with the Nirgranthas referred to in the *Nyāyamañjarī* of Jayanta Bhatta The question arises how to fill up the gap of history of evolution of Jaina Sangha in between the period of Ajitanatha and that of Aristanemi if Rsabhadeva is accepted as a historical personage The historicity of Parsvanatha and Mahavira has been established by the historians with a critical study of genuine historical evidences. An idea can be formed about the evolution of Jaina Sangha in the periods of Parsvanatha and Mahavira, but no definite idea can be formed about the real position of it during the periods of all the Tirthankaras on the basis of the stereotyped traditional account of it as given in the present *Agamas* A short account of some post-Mahaviran Jaina monastic orders along with their respective branches under the spiritual leadership of their respective Acaryas is presented by the *Kalpasūtra Sthavirāvali* and the *Nandīsūtra Pattāvali*. The historical existence of such

monastic orders has been proved by the epigraphic evidences of the early Mathura inscriptions.

The existence of Jaina Sanghas under the spiritual leadership of the Parsvapatyas and Mahavira respectively was a historical fact. They were independent entities in the sense that each of them constituted by itself an intelligible field of historical study but at the same time they were the representatives of a single Sangha of the Nirgranthas And they got united under the dynamic spiritual leadership of Mahavira. It appears that Jaina Sanghas in the post-Mahaviran period belonged by nature to the past as well as to the future. The evidential value of the post-Mahaviran Jaina Sanghas is conditional. We find them in conjunction with a Sangha, we take them as the corroborative evidence for the instance of apparentation and affiliation which the existence of Jaina Sangha established. The sketch of the expansion of Jaina Sangha in the post-Mahaviran period with its branches in different direction explains in geographical terms how the Jaina society came to be apparently separated to affiliated branches of Jaina Sangha. In terms of life and growth we can trace the differentiation of eastern and western branches of orthodox Jaina Sangha in the division and sub-division of their common chrysalis into different bodies—Sakhas and Kulas, etc. The division took rather more than five centuries to work itself out and the final result was the cumulative effect of some crises in Jaina Sangha leading to schisms and final division of it into the Svetambara and Digambara sects

These two sects again evolved into many branches and sub-branches in the Acarya period within the four quarters of India with amazing speed upto the present day. Although it is difficult to establish direct links among various Jaina monastic orders in India at the present state of our knowledge about their origin, growth and development, nevertheless, it may be said with an objective approach to the history of Jaina Sangha that it has undergone gradual orderly changes since its birth with the march of time at different times and places in India. It has descended from a simple organization in North India by gradual modifications in successive periods and branched off into many divisions of monastic order. The process of evolution of Jaina Sangha has not ceased but is occurring more rapidly to-day than in many of the past ages In the last few hundred years many Jaina monastic orders have become extinct and many others have arisen. Although the process is usually too gradual to be observed, there are notable example of evolutionary change with the time of recorded history. Jaina Sangha of Mahavira had expanded and its members multiplied with amazing speed and by the twentieth century its branches are strikingly different from the original North Indian Jaina Sangha

In exploring the spatial extension of Jaina Sangha which includes four quarters of India it is to be pointed out in short that the Jaina Missions were the events in the life of Indian society of which Jaina sects and Jaina Sangha with its branches and sub-branches were only parts. When the spatial cross-sections of Jaina Sangha are taken into account it is found from the analysis of the factors--places of social, cultural, economic and political life that the Indian society differs perceptively according to the plane on which attention is focussed. For example, when one passes to the cultural plane, he finds that the present geographical extension of the Jaina society to which the Jaina sects and Jaina Sanghas and sub-sanghas belong appears to be very much smaller.

When the extension of Jaina Sangha in time is examined, one is at once confronted with the difficulty that he cannot see into the future a limitation which greatly restricts the amount of light that the contemporary historical study of Jaina Sangha can throw upon the nature of the society to which it belongs. Ex-hypothesi, one cannot survey the whole life of Jaina Sangha of which he himself is a member, and which therefore will still be living its life as long as he remains alive to observe it. History is alive to observe it History of Jaina Sangha will only become visible at full length and true perspective after the Jaina society has become extinct and this spectacle, if it is even to be beheld by human eyes, is necessarily reserved for future historians living in a different social environment from the present one and taking their historical observation from a different angle of vision. In the process of tracing the history of Jaina Sangha backward towards its origin one strikes upon the last phase of another society of the same kind the original of which evidently lies considerably further back in the past. This conclusion regarding the age and origin of Jaina Sangha carries with it a corollary regarding the continuity of the history of Jaina Sangha, as the continuity of history is the most attractive of all the conceptions. The concept of continuity of Jaina Sangha is only significant as a symbolic mental background on which one can plot out his perceptions of discontinuity in all their actual variety and complexity

The spiritual revolution started by Rsabhadeva, the first Tirthankara, had already completed itself and spent its energy and a new evolution had taken place in the times of Parsvanatha and Mahavira and the later Acaryas. Thus Jaina religious movement has become a Jaina Sangha and the spiritual movement of it has become well a national force.

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